

APPENDIX E

Support for Claims 79-118 can be found in the specification of the Appleby et al application Serial No. 08/360,184 as follows:

Application Claims

79. A process according to claim 63, wherein the partial vapor pressure of the volatile alcohol in the initial reaction stage is less than 100 mm Hg.

80. A process according to claim 79, wherein the partial vapor pressure of the volatile alcohol is maintained by sparging with an inert gas.

81. A process according to claim 63, wherein the one or more subsequent reaction zones are provided in a tray reactor.

Support in Appleby et al Application

Page 18, line 30-32: “. . . the partial pressure of the alcohol in the initial stage should be less than about 100 mm Hg, . . .”

Page 18, 23-28: “In order to maintain an acceptable speed of reaction with higher pressures, it is necessary to use reactors with high surface areas and/or improved agitation and or sparging with an inert gas...to aid in the removal of the volatile alcohol”

Page 4, lines 1-7: “. . . the removal of the volatile alcohol produced by the reaction between the ester reactant and the polyol is assisted by increasing the mass transfer area of the reaction mixture by increasing the surface area of the reactor and/or sparging...to reduce the volatile alcohol's partial pressure”

Page 21, lines 25-32: The final stage, or stages, of the reaction should be carried out under plug-flow This plug-flow . . . preferably is accomplished more efficiently in a continuous reactor, for example, in a . . . tray reactor . . .”

82. A process according to claim 63, wherein the emulsifier is used in the initial reaction stage in an amount of from about 3% to about 11% by weight of the reactants.

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers"

Page 41, lines 30-33: "The feed mixture is composed of...potassium stearate soap (about 11% by weight)"

Page 43, lines 28-30: "The feed mixture is composed of . . . a reduced level of potassium stearate soap (about 3% by wt.)"

83. A process according to claim 63, wherein the initial reaction stage is carried out in a continuous reaction vessel having stirring means.

Page 35, lines 30-31: "Examples 9 and 10 make use of a 3-liter continuous stirred tank reactor (CSTR) to perform the initial stage of the reaction."

Page 40, lines 3-6: Example 13. "This example demonstrates the ability to utilize the series of three Continuously Stirred Tank Reactors (CSTR) for the first stage of the reaction..."

84. A process according to claim 83, wherein in the initial reaction stage the stirring means applies agitation to ensure thorough mixing of the reaction components.

Page 19, lines 3-4: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions"

Page 25, lines 15-18: "It is highly preferred that the reaction mixture, or mixtures, be stirred as vigorously as possible."

85. A process according to claim 63, wherein the initial reaction stage is carried out in a continuous stirred tank reactor.

Page 35, lines 30-31: "Examples 9 and 10 make use of a 3-liter continuous stirred tank reactor (CSTR) to perform the first stage of the reaction".

86. A process according to claim 63, wherein the steady-state reaction mixture in the first zone is capable of solubilizing the polyol.

Page 19, lines 3-9: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions to maintain a degree of esterification between about 10% (preferably 20%) and about 70%, This degree of esterification provides sufficient lower partial polyol polyester to aid in the solubilization of the poorly soluble polyol"

87. A process according to claim 63, wherein the final degree of esterification is 95% or more.

Page 4, line 26-28: ". . . a final degree of esterification of at least about 70%, preferably at least about 95%; . . ."

88. A process according to claim 63, wherein the final degree of esterification is 98% or more.

Page 21, lines 36-37: "the final degree of esterification should be at least about 70%, preferably, at least about 98%."

89. A process for the synthesis of polyol fatty-acid polyesters

Page 1, lines 13-14: "This invention relates to improve synthesis of higher polyol fatty-acid polyester."

by reacting a polyol and

Page 2, lines 29-31: "The present invention relates to . . . interesterifying (a) polyol . . ."

a fatty-acid lower-alkyl ester of a volatile C₁-C₄ alcohol

Page 2, lines 32-33: ". . . and (b) fatty-acid ester of easily removable alcohol, . . ."

Page 5, lines 29-30: ". . . preferably esters of volatile alcohols e.g., the C₁-C₄ . . ."

under substantially solvent free conditions

Page 1, lines 13-16: "This invention relates to improved synthesis of higher polyol fatty-acid polyesters . . . via transesterification reactions that do not use a solvent to form a homogenous reaction mix."

Page 2, lines 34-35: "... in the absence of any substantial amount of unreacted solvent, . . ."

in the presence of a catalyst and

Page 3, lines 5-7: "The process is a continuous process in which the initial catalyst level is from about 0.01 to about 0.5 moles of catalyst per mole of polyol..."

Page 11, lines 26-27: "The basic catalysts generally suitable for use in preparing the polyol polyesters described herein are..."

an emulsifier,

Page 3, lines 9-10: "The initial level of soap emulsifier in the first state of the reaction is from about 0.001 to about 0.6 ... moles per mole polyol; ..."

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers in the processes described herein."

the process comprising: an initial reaction stage

Page 24, lines 37-38: "In general it is desirable, and even preferred, to effect the reaction in at least two stages . . ."

which is carried out under such conditions that the reaction mixture in said initial stage is in steady-state, with continuous introduction of reactants

Page 1, lines 13-17: "This invention relates . . . more specifically to a continuous process . . ."

Page 35, lines 30-31: "Examples 9 and 10 make use of a 3-liter continuous stirred tank reactor (CSTR) to perform the first stage of the reaction."

Page 35, lines 35-36, lines 2: "A feed mixture for the continuous reactor is prepared . . ."

Page 36, lines 5-6: "The continuous reactor is started up and allowed to reach steady-state."

Page 42, lines 9-14: ". . . continuous operation is started with the feed slurry introduced into the first reactor and the intermediate product from the first reactor cascading to the second and so on down the train. The reactors are allowed reach steady-state with the average composition at steady-state exiting from each reactor about the following."

Page 19, lines 14-19: "In a continuous reaction, the individual reactants can be added to the first stage at a rate that maintains the desired degree of esterification and yet provides sufficient yield from the first stage to maintain the reaction in the subsequent stage, or stages."

Page 20, lines 5-7: ". . . reactants are continually added and the product is removed at rates that maintain the desired level of esterification."

comprising polyol and fatty-acid lower-alkyl ester, and

Page 24, lines 27-31: "an initial heterogeneous reaction mixture comprises...polyol [and] . . . fatty-acid ester . . ."

Page 5, lines 26-31: ". . . the terms, 'fatty-acid ester(s)' and 'ester reactant(s)' . . . are preferably esters of volatile alcohols, e.g. the C₁-C₄ (preferably methyl)...esters of fatty-acids . . ."

continuous removal of products comprising reaction mixture having a degree of esterification of about 10% or more and

Page 42, lines 9-14: ". . . continuous operation is started with the feed slurry introduced into the first reactor in the intermediate product from the first reactor cascading into the second and so on down the train. The reactors are allowed to reach steady-state with the average composition at steady-state exiting from each reactor about the following."

Page 36, lines 8-11: "At steady state the product exiting from the continuous reactor has an average composition of about 3.05 fatty acid chains per molecule of sucrose, and contains about 2.11% by weight of sucrose." ("Degree of esterification" is defined at Page 2, lines 18-23 as a percentage "of the total number of available hydroxy groups of the polyol [that] are esterified with a fatty acyl radical." Therefore, 3.05 fatty-acid chains per molecule of sucrose (which has 8 available hydroxy groups) is equivalent to 3.05/8, or a degree of esterification of 38.125%.)

Page 20, lines 5-7: “. . . reactants are continually added and the product is removed at rates that maintain the desired level of esterification.”

Page 19, lines 3-6: “It is highly desirable to conduct the initial stage . . . to maintain the degree of esterification between about 10% (preferably 20%) and about 70%”

volatile alcohol formed during the initial reaction stage, and

Page 3, lines 37 - Page 4, line 5: “The said easily removable alcohol is a volatile alcohol...and the removal of the volatile alcohol produced by the reaction between the ester reactant and the polyol is assisted by increasing the mass transfer area of the reaction mixture by increasing the surface area in the reactor and/or sparging”

one or more subsequent reaction stages in which the reaction mixture from said initial stage is further reacted to said polyol fatty-acid polyesters.

Page 24, lines 37-38: “In general it is desirable and even preferred, to effect the reaction in at least two stages”

Page 19, lines 14-18: “In a continuous reaction, the individual reactant can be added to the first stage at a rate that maintains the desired degree of esterification and yet provides sufficient yield from the first stage to maintain the reaction in the subsequent stage, or stages.”

Page 4, lines 23-28: "The final stage, or stages, of the reaction are carried out . . . after the degree of esterification of said polyol has reached at least about 50% to achieve a final degree of esterification of at least 70%, preferably at least about 95%; . . ."

Page 21, lines 25-37: "The final stage, or stages, of the reaction should be carried out under . . . conditions to . . . achieve high degrees of esterification . . . the final degree of esterification should be at least about 70%, preferably at least about 98%."

90. A process according to claim 89, wherein the fatty-acid lower-alkyl ester is a fatty-acid methyl ester

Page 5, lines 25-30: "the terms 'fatty-acid ester(s)' and 'ester reactant (s)' are intended to include any compound wherein the alcohol portion is easily removed, . . . but are preferably esters of volatile alcohols, e.g., the C₁-C₄ (preferably methyl), . . ."

91. A process according to claim 89, where there is one in-going reactant stream in the initial stage.

Page 35, line 34 - Page 36, line 7: Example 9. "A feed mixture for the continuous reactor is prepared in a 22-liter feed tank. This feed mixture is composed of about 10686 grams of partially hardened soybean methyl esters, about 850 grams of potassium stearate soap, about 50 grams of potassium carbonate, and about 2272 grams of sucrose The continuous reactor is started up and allowed to reach steady-state."

Page 36, line 30 - Page 37, line 18, Example 10: Variation (a): "A feed mixture for the continuous first stage reactor (described in Example 9) is prepared in a 22 liter feed tank. The feed mixture consists of . . . partially hardened soybean methyl esters, . . . potassium stearate soap, . . . potassium carbonate . . . sucrose The continuous reactor is started up and allowed to reach steady-state" (Examples 9 and 10 exemplify processes in which there is a reaction mixture coming from the feed tank into the first stage reactor. As the ingredients are all in the feed mixture, there is one incoming reactant stream into the initial stage.)

92. A process according to claim 89, wherein the emulsifier is used in the initial reaction stage in an amount of from about 3% to about 11% by weight of the reactants.

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers"

Page 41, lines 30-33: "The feed mixture is composed of...potassium stearate soap (about 11% by weight),"

Page 43, lines 28-30: "The feed mixture is composed of . . . a reduced level of potassium stearate soap (about 3% by wt.)"

93. A process for the synthesis of polyol fatty-acid polyesters by reacting a polyol and a fatty-acid lower-alkyl ester under substantially solvent free conditions

Support the same as for the corresponding portion of claim 89 set forth above.

in the presence of a catalyst selected from the group consisting of alkali metals, alloys of two or more alkali metals, alkali metal hydrides, alkali metal alkoxides, potassium carbonate, sodium carbonate, barium carbonate, potassium hydroxide and mixtures thereof,

and an emulsifier,

the process comprising: an initial reaction stage which is carried out under such conditions that the reaction mixture in said initial stage is in steady-state, with continuous introduction of reactants comprising polyol and fatty-acid lower-alkyl ester, and continuous removal of products comprising reaction mixture having a degree of esterification of about 10% or more and volatile alcohol formed during the initial reaction stage, and

one or more subsequent reaction stages in which the reaction mixture from said initial stage is further reacted to said polyol fatty-acid polyesters.

Page 1-1, lines 27-37: "The basic catalysts generally suitable for use . . . are those selected from the group consisting of alkali metals, . . . alloys of two or more alkali metals . . . alkali metal hydrides . . . alkali metal alkoxides In another particularly preferred embodiment of the present invention, the basic catalyst used in the reaction is potassium carbonate, sodium carbonate, barium carbonate, or mixtures of these compounds"

Page 34, lines 32-33: "The catalyst in this reaction is the residual KOH in the soap."

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

94. A process according to claim 93, wherein the fatty-acid lower alkyl ester is an ester of a volatile C₁-C₄ alcohol.

Page 5, lines 26-30: "As used herein, the terms 'fatty-acid ester(s)' and 'ester reactant(s)' are intended to include any compound wherein the alcohol portion is easily removable ... but are preferably esters of volatile alcohols, e.g., the C₁-C₄ (preferably methyl),"

95. A process according to claim 93, wherein the catalyst is selected from the group consisting of sodium carbonate, potassium carbonate, potassium hydroxide and mixtures thereof.

Page 11, lines 36-37: ". . . the basic catalyst used in the reaction is potassium carbonate, sodium carbonate, barium carbonate, or mixtures of these compounds"

Page 34, lines 32-33: "The catalyst in this reaction is the residual KOH in the soap."

96. A process according to claim 63, wherein the fatty-acid lower-alkyl is an ester of a volatile C₁-C₄ alcohol.

Page 5, lines 26-30: "As used herein, the terms 'fatty-acid ester(s)' and 'ester reactant(s)' are intended to include any compound wherein the alcohol portion is easily removable . . . but are preferably esters of volatile alcohols, e.g., the C₁-C₄ (preferably methyl),"

97. A process according to claim 96, wherein the catalyst is selected from the group consisting of alkali metals, alloys of two or more alkali metals, alkali metal hydrides, alkali metal alkoxides, potassium carbonate, sodium carbonate, barium carbonate, potassium hydroxide and mixtures thereof.

Page 11, lines 27-37: "The basic catalysts generally suitable for use . . . are those selected from the group consisting of alkali metals, . . . alloys of two or more alkali metals . . . alkali metal hydrides . . . alkali metal alkoxides In another particularly preferred embodiment of the present invention, the basic catalyst used in the reaction is potassium carbonate, sodium carbonate, barium carbonate, or mixtures of these compounds"

Page 34, lines 32-33: "The catalyst in this reaction is the residual KOH in the soap."

98. A process according to claim 97, wherein the molar ratio of fatty-acid lower-alkyl ester to esterifiable site on the polyol is from about 0.9:1 to about 1.4:1.

Page 5, lines 26-30: "... the terms ... 'ester reactant(s)' are intended to include any compound wherein the alcohol portion is easily removed ... but are preferably of volatile alcohols, e.g., the C₁-C₄ ..."

Page 17, lines 8-10: "In the reaction, it is preferable to use a molar ratio of total ester reactant to esterifiable sites on the polyol of from about 0.9:1 to about 1.4:1, ..."

99. A process according to claim 97, wherein soap is used in the initial reaction stage in an amount of from about 3% to about 11% by weight of the reactants.

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers ..."

Page 41, lines 30-33: "The feed mixture is composed of...potassium stearate soap (about 11% by weight), ..."

Page 43, lines 28-30: "The feed mixture is composed of ... a reduced level of potassium stearate soap (about 3% by wt.), ..."

100. A process according to claim 97, wherein the emulsifier introduced into the initial reaction stage is soap.

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers ..."

101. A process according to claim 100, wherein the polyol is sucrose and the reaction mixture product from the initial stage comprises not more than 4.2% unreacted sucrose.

Page 36, lines 5-11: "The continuous reactor is started up and allowed to reach steady-state ... At steady-state the product exiting from the continuous reactor has an average composition of about 3.05 fatty-acid chains per molecule of sucrose, and contains about 2.11% by weight of sucrose."

Page 40, lines 4-35: "This example demonstrates the ability to utilize a series of three Continuously Stirred Tank Reactors (CSTR) for the first stage of a reaction to make sucrose polyesters The reactors are allowed to reach steady-state [the product] exiting from the third reactor having an average composition of about 1% potassium soap, about 5.5 fatty-acid chains per molecule of sucrose and less than about 1% of sucrose."

Page 41, line 14 - Page 42, line 23: "This example demonstrates the ability to run the reaction continuously using a series of five CSTR reactors . . . continuous operation is started with the feed slurry introduced into the first reactor and the intermediate product from the first reactor cascading to the second and so on down the train" (The data set forth in the table on Page 42, line 20 indicates that the product exiting the first reactor comprised 4.2% by weight sucrose.)

Page 43, line 19 - Page 44, line 24: "A reactor train comprising five CSTR reactors of Example 14 are operated The reactors are allowed to reach steady-state with the average composition at steady-state exiting from each reactor being about the following:" (The data set forth in the table on page 44, line 24 indicates that the product exiting the first reactor comprised 4.2% by weight sucrose.)

102. A process according to claim 101, wherein the initial reaction stage temperature is in the range of from about 130°C to about 130°C.

103. A process according to claim 102, wherein the initial reaction stage is carried in a continuous stirred tank reactor.

Page 18, lines 2-4: "It is highly preferable to run the reaction in the initial stages at temperatures between about 250°F (130°C) and about 285°F (140°C)"

Page 35, lines 30-31: "Examples 9 and 10 make use of a 3-liter continuous stirred tank reactor (CSTR) to perform the first stage of the reaction."

Page 40, lines 3-6, Example 13: "This example demonstrates the ability to utilize a series of three Continuously Stirred Tank Reactors (CSTR) for the first stage of a reaction to make sucrose polyesters"

104. A process according to claim 102, wherein the initial reaction stage is carried out in a continuous vessel having a stirring means.

Page 35, lines 30-31: "Examples 9 and 10 make use of a 3-liter continuous stirred tank reactor (CSTR) to perform the initial stage of the reaction."

Page 40, lines 3-6: Example 13. "This example demonstrates the ability to utilize a series of three Continuously Stirred Tank Reactors (CSTR) for the first stage of a reaction to make sucrose polyesters"

105. A process according to claim 96, wherein the catalyst is selected from the group consisting of sodium carbonate, potassium carbonate, potassium hydroxide and mixtures thereof.

Page 11, lines 36-37: ". . . the basic catalyst used in the reaction is potassium carbonate, sodium carbonate, barium carbonate, or mixtures of these compounds. . . ."

Page 34, lines 32-33: "The catalyst in this reaction is the residual KOH in the soap."

107. A process according to claim 63, wherein the initial reaction stage is carried out in a continuous stirring reaction vessel having stirring means,

Page 35, lines 30-31: "Examples 9 and 10 make use of a 3-liter continuous stirred tank reactor (CSTR) to perform the initial stage of the reaction."

Page 40, lines 3-6, Example 13: "This example demonstrates the ability to utilize the series of three Continuously Stirred Tank Reactors (CSTR) for the first stage of a reaction to make sucrose polyesters . . ."

wherein in the initial reaction stage the degree of esterification is between about 10% and about 70%, and

Page 19, lines 3-7: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions to maintain a degree of esterification between about 10% (preferably 20%) and about 70%, . . ."

wherein the fatty-acid lower-alkyl ester is an ester of a volatile C₁-C₄ alcohol.

Page 5, lines 26-30: "As used herein, the terms 'fatty-acid ester(s)' and 'ester reactant(s)' are intended to include any compound wherein the alcohol portion is easily removable . . . but are preferably esters of volatile alcohols, e.g., the C₁-C₄ (preferably methyl), . . ."

108. A process according to claim 107, wherein in the initial reaction stage the stirring means applies agitation to ensure thorough mixing of the reaction components.

Page 19, lines 3-4: "It is highly desirable to conduct the initial stage, or stages, of the reaction under mixing conditions . . ."

Page 25, lines 15-18: "It is highly preferred that the reaction mixture, or mixtures, be stirred as vigorously as possible."

108. A process according to claim 107, wherein in the initial reaction stage the stirring means applies agitation to ensure thorough mixing of the reaction components.

Page 19, lines 3-4: "It is highly desirable to conduct the initial stage, or stages, of the reaction under mixing conditions"

Page 25, lines 15-18: "It is highly preferred that the reaction mixture, or mixtures, be stirred as vigorously as possible."

109. A process according to claim 108, wherein the initial reaction stage temperature is in the range of from about 130°C to about 140°C.

Page 18, lines 2-4: "It is highly preferable to run the reaction in the initial stages at temperatures between about 250°F (130°C) and about 285°F (140°C)"

110. A process according to claim 85, wherein the fatty-acid lower-alkyl ester is an ester of a volatile C₁-C₄ alcohol.

Page 5, lines 26-30: "As used herein, the terms 'fatty-acid ester(s)' and 'ester reactant(s)' are intended to include any compound wherein the alcohol portion is easily removable . . . but are preferably esters of volatile alcohols, e.g., the C₁-C₄ (preferably methyl)"

111. A process according to claim 110, wherein the catalyst is selected from the group consisting of alkali metals, alloys of two or more alkali metals, alkali metal hydrides, alkali metal alkoxides, potassium carbonate, sodium carbonate, barium carbonate, potassium hydroxide and mixtures thereof.

Page 11, lines 27-37: "The basic catalysts generally suitable for use . . . are those selected from the group consisting of alkali metals, . . . alloys of two or more alkali metals . . . alkali metal hydrides . . . and alkali metal alkoxides . . . In another particularly preferred embodiment of the present invention, the basic catalyst used in the reaction is potassium carbonate, sodium carbonate, barium carbonate, or mixtures of these compounds"

Page 34, lines 32-33: "The catalyst in this reaction is the residual KOH in the soap."

112. A process according to claim 111, wherein the initial reaction stage temperature is in the range of from about 130°C to about 140°C.

Page 18, lines 2-4: "It is highly preferable to run the reaction in the initial stages at temperatures between about 250°F (130°C) and about 285°F (140°C)"

113. A process according to claim 112, wherein the emulsifier is soap.

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers"

114. A process for the synthesis of polyol fatty-acid polyesters by reacting a polyol and a fatty-acid lower-alkyl ester under substantially solvent free conditions

Support the same as for the corresponding portion of claim 89 set forth above.

in the presence of a catalyst selected from the group consisting of alkali metals, alloys of two or more alkali metals, alkali metal hydrides, alkali metal alkoxides, potassium carbonate, sodium carbonate, barium carbonate, potassium hydroxide and mixtures thereof,

Support the same as for the corresponding portion of claim 93 set forth above.

and an emulsifier,

Support the same as for the corresponding portion of claim 89 set forth above.

the process comprising: an initial reaction stage wherein the temperature is in the range of from about 130°C to about 140°C,

Page 18, lines 2-4: "It is highly preferable to run the reaction in the initial stages at temperatures between about 250°F (130°C) and about 285°F (140°C),"

which is carried out under such conditions that the reaction mixture in said initial stage is in steady-state, with continuous introduction of reactants comprising polyol and fatty-acid lower-alkyl ester, and continuous removal of products comprising reaction mixture having a degree of esterification of about 10% or more and volatile alcohol formed during the initial reaction stage, and

one or more subsequent reaction stages in which the reaction mixture from said initial stage is further reacted to said polyol fatty-acid polyesters.

115. A process according to claim 114, wherein the emulsifier is used in the initial reaction stage in an amount of from about 3% to about 11% by weight of the reactants.

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

Page 11, lines 7-8: "Alkali metal soaps are typically, and preferably, used as emulsifiers"

Page 41, lines 30-33: "The feed mixture is composed of...potassium stearate soap (about 11% by weight)"

Page 43, lines 28-30: "The feed mixture is composed of . . . a reduced level of potassium stearate soap (about 3% by wt.)"

116. A process for the synthesis of polyol fatty-acid polyesters by reacting a polyol and a fatty-acid lower-alkyl ester under substantially solvent free conditions in the presence of a catalyst and an emulsifier, the process comprising:

an initial reaction stage which is carried out under such conditions that the reaction mixture in said initial stage is in steady-state, with continuous introduction of reactants comprising polyol and fatty-acid lower-alkyl ester, and continuous removal of products comprising reaction mixture having a degree of esterification of about 10% or more and volatile alcohol formed during the initial reaction stage, and

one or more subsequent reaction stages in which the reaction mixture from said initial stage is further reacted to said polyol fatty-acid polyesters;

wherein the conditions in the initial reaction stage provide a stable heterogeneous reaction mixture.

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

Page 19, lines 3-9: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions to maintain the degree of esterification between about 10% (preferably 20%) and about 70% This degree of esterification provides sufficient lower partial polyol polyester to . . . provide a stable heterogeneous reaction mixture . . ."

117. A process for the synthesis of polyol fatty-acid polyesters by reacting a polyol and a fatty-acid lower-alkyl ester under substantially solvent free conditions in the presence of a catalyst and an emulsifier, the process comprising:

Support the same as for the corresponding portion claim 89 set forth above.

an initial reaction stage which is carried out under such conditions that the reaction mixture in said initial stage is in steady-state, with continuous introduction of reactants comprising polyol and fatty-acid lower-alkyl ester, and continuous removal of products comprising reaction mixture having a degree of esterification of about 10% or more and volatile alcohol formed during the initial reaction stage, and

one or more subsequent reaction stages in which the reaction mixture from said initial stage is further reacted to said polyol fatty-acid polyesters;

wherein the conditions of the initial reaction stage aid in solubilizing the polyol.

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

Page 19, lines 3-9: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions to maintain the degree of esterification between about 10%" (preferably 20%) and about 70%, This degree of esterification provides sufficient lower partial polyol polyester to aid in the solubilization of the poorly soluble polyol"

118. A process for the synthesis of polyol fatty-acid polyesters by reacting a polyol and a fatty-acid lower-alkyl ester under substantially solvent free conditions in the presence of a catalyst and an emulsifier, the process comprising:

Support the same as for the corresponding portion of claim 89 set forth above.

an initial reaction stage which is carried out under such conditions that the reaction mixture in said initial stage is in steady-state, with continuous introduction of reactants comprising polyol and fatty-acid lower-alkyl ester, and continuous removal of products comprising reaction mixture having a degree of esterification of about 10% or more and volatile alcohol formed during the initial reaction stage, and

one or more subsequent reaction stages in which the reaction mixture from said initial stage is further reacted to said polyol fatty-acid polyesters;

wherein the conditions of the initial reaction stage aid in solubilizing the polyol

and provide a stable heterogeneous reaction mixture.

Support the same as for the corresponding portion of claim 89 set forth above.

Support the same as for the corresponding portion of claim 89 set forth above.

Page 19, lines 3-9: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions to maintain the degree of esterification between about 10%" (preferably 20%) and about 70%, This degree of esterification provides sufficient lower partial polyol polyester to aid in the solubilization of the poorly soluble polyol"

Page 2, lines 29-33: "The present invention relates to improved, preferably continuous, processes for preparing highly esterified polyol fatty-acid polyester by interesterifying...in a heterogeneous reaction mixture..."

Page 19, lines 3-9: "It is highly desirable to conduct the initial stage, or stages, of the reaction under back-mixing conditions to maintain the degree of esterification between about 10%" (preferably 20%) and about 70%, This degree of esterification provides sufficient lower partial polyol polyester to . . . provide a stable heterogenous reaction mixture"
